

A Report for Sanctuary Advisory Council Members

Reporting Period: May 15, 2015 – July 10, 2015

ABOUT THE SANCTUARY

Olympic Coast National Marine Sanctuary spans 3,189 square miles of marine waters off the rugged Olympic Peninsula coastline. The sanctuary extends 25 to 50 miles seaward, covering much of the continental shelf and several major submarine canyons.

The sanctuary protects a productive upwelling zone – home to rich marine mammal and seabird faunas, diverse populations of kelp and intertidal algae, and thriving invertebrate communities. The sanctuary is also rich in cultural resources, with over 150 documented historical shipwrecks and the vibrant contemporary cultures of Makah, Quileute and Hoh Indian Tribes, and Quinault Nation.

OFFICE REPORT

OLYMPIC COAST NATIONAL MARINE SANCTUARY NEWS AND PROGRAM UPDATES

Organized based on Olympic Coast National Marine Sanctuary (OCNMS or sanctuary) management plan priority areas.

TREATY TRUST RESPONSIBILITY

Olympic Coast Intergovernmental Policy Council Discusses Habitat Framework

On May 27, sanctuary staff attended an Olympic Coast Intergovernmental Policy Council (IPC) meeting in Taholah. The major agenda topic was related to the IPC Habitat Framework Initiative with a briefing on work done to date and discussion of recommended next steps. The IPC previously agreed to use Coastal and Marine Ecological Classification Standard (CMECS) for describing the Washington coast's habitat and discussed the creation of a subcommittee to inform biotype descriptions in the study area. A number of NOAA staff are providing technical support to the process.

ACHIEVE EFFECTIVE AND COORDINATED

MANAGEMENT

Multi-Year Vessel Tracking Data to Support Washington State Marine Spatial Planning

Olympic Coast National Marine Sanctuary is connected to both the Big Eddy Ecosystem and the California Current Large Marine Ecosystem. Through its Vessel Monitoring System, OCNMS has taken an active role protecting its Area to be Avoided and Washington's outer coast – one of North America's most productive marine regions and spectacular, undeveloped shorelines – from the potential release of oil or other hazardous material from a major marine accident. Over the past several years, OCNMS has turned to Satellite Automatic Identification System (SAIS) to track vessel movement around and through the sanctuary. To support Washington State's Marine Spatial Planning initiative, OCNMS used SAIS data to develop Vessel Density Maps showing primary shipping routes for cargo ships, tankers, tugs, passenger vessels, recreational vessels and military ships. Maps for these vessel groups and their routes will help inform marine spatial planning.

Seeking Support for New Education and Visitor Service Facility in Port Angeles

Carol Bernthal and Melissa Williams, Executive Director, Feiro Marine Life Center, made a presentation to the Clallam County Lodging Tax Advisory Committee to request feasibility funds to assess options for a new educational and visitor outreach center at the City Pier in Port Angeles, WA. The new facility would better serve visitors to and residents of the Olympic Peninsula. The Lodging Tax Advisory Committee makes recommendations to Clallam County Commissioners on funding for projects that increase visitation to the region. The presentation was favorably received and a decision will be announced in the coming weeks.

Olympic National Park Staff Receive Training on National Marine Sanctuaries

Olympic Coast National Marine Sanctuary and the national marine sanctuary system were highlighted during Olympic National Park's annual staff training attended by approximately one hundred new and seasonal staff members. Following presentations on the sanctuary educational and outreach programs, research projects and resource protection programs, additional breakout sessions allowed for more in-depth discussions. Olympic National Park staff also gained a deeper understanding of marine life, habitats, history and culture.

Olympic National Park Rangers Train with Olympic Coast National Marine Sanctuary

Fifteen Olympic National Park coastal law enforcement and interpretive rangers attended a half-day training on Olympic Coast National Marine Sanctuary. Rangers received a comprehensive overview of the national marine sanctuary system and OCNMS, and then learned specifics about resource protection policies and procedures for marine mammal strandings, marine debris, Olympic Coast Sanctuary's Area to be Avoided and overflight regulations. OCNMS also gave eight Olympic National Park coastal rangers a guided tour of sanctuary waters aboard its Rigid Hull Inflatable boat. The cruise supplemented an annual two-week training course that also included classroom presentations.



IMPROVE OCEAN LITERACY

National Education Team Comes Together at Olympic Coast



More than thirty educators from across the National Marine Sanctuary System and partner organizations attended the National Marine Sanctuaries Education Meeting at Lake Crescent. Olympic Coast National Marine Sanctuary provided an introductory presentation and hosted a "Sense of Place" day, introducing the education team to Olympic Coast through a tidepool exploration and a visit to Makah Museum and Cape Flattery in Neah Bay. Various topics were covered throughout the four-day meeting, including: a review and discussion of the five-year Office of National Marine Sanctuaries Education and Outreach Implementation Plan goals and objectives; opportunities for education grants in partnership with the National Marine Sanctuary Foundation; creative funding opportunities for education programs;

visitor centers; National Network for Ocean and Climate Change Interpretation; the process for approval and clearing of education and outreach products; and use of social media. Carol Bernthal and Canadian Parks and Wilderness Society (CPAWS) Marine Conservation Coordinator Alexandra Barron presented on the significance of The Big Eddy ecosystem and worked with the education team to develop key messages for target audiences.

Olympic Coast Discovery Center Volunteers Complete Training

Three new docents completed six training sessions in order to begin volunteering at the Olympic Coast Discovery Center (OCDC). The training sessions consisted of various presentations on topics representing each of OCDC's exhibits and current sanctuary and marine issues. The 2015 spring OCDC volunteer training also included an all-day field trip to Neah Bay to incorporate tribal culture from the Makah Museum, followed by a Cape Flattery hike, where volunteers witnessed some of the sanctuary's natural resources, including sea lions, a gray whale and a pod of transient orcas. During a half-day tidepooling excursion, the trainees also learned about intertidal species and habitats at Salt Creek Reserve.



Olympic Coast Education with Makah Tribal Students



Olympic Coast National Marine Sanctuary education staff worked with Neah Bay High School juniors in their science class to look at research conducted in the sanctuary, as well as the components of a successful ocean conservation plan. After learning about OCNMS careers, students played the OCNMS Research Expedition Game. Student teams chose a sanctuary research project, selected supplies and personnel according to their project budget and attempted to complete their mission in 3-5 days. As a result of the game, students learned about the role of collaboration and compromise in research projects that include partners and budget parameters.

Additionally, OCNMS Citizen Science Coordinator Heidi Pedersen and sanctuary volunteer Sally Parker trained Makah tribal students from two Neah Bay High School biology classes about citizen science. Following a brief presentation on Coastal Observation and Seabird Survey Team (COASST) and NOAA Marine Debris Monitoring, students participated in hands-on activities, identifying birds with the COASST Beached Bird Guide and passing around marine debris collected from local beaches.

The Makah Tribe also celebrated Neah Bay Elementary School Beach Day, in partnership with OCNMS, with 164 students and their families. Participants joined fun beach activities, including intertidal monitoring, sand castle building and tug of war. Sanctuary educators led tidepool exploration and marine debris awareness games.

Olympic Coast Welcomes Three Hollings Scholars

Olympic Coast National Marine Sanctuary (OCNMS) welcomes three new Hollings Scholars for 2015: Kathryn Hobart, Billie Case and Courtney Knox. The Hollings Scholarship is designed to support undergraduate studies in oceanic and atmospheric science, research, technology and education, to increase public understanding and support for stewardship of the ocean and atmosphere and improve environmental literacy, as well as recruit and prepare students for public service careers with NOAA.

Kathryn Hobart is a rising senior majoring in Geology at Oberlin College. While interning at OCNMS, she will be working with NOAA marine debris data collection program to analyze trends in debris collection and produce outreach materials to educate volunteers and the general public.



Billie Case is a rising senior majoring in Environmental Studies at American University. Partnering with Feiro Marine Life Center, Billie will coordinate three, four-day Junior Oceanographer camps for late June and early July. Designed for children ages 5-12, the program content will include themes of sanctuary-specific biodiversity and habitats, as well as navigational activities.

Courtney Knox is a rising senior majoring in Mathematics at Western Washington University. Partnering with Feiro Marine Life Center, Courtney will coordinate two, four-day Marine Tech camps held in late July and one, four-day Junior Oceanographer camp held in early August. Designed for children ages 12-15, the Marine Tech camps will seek to increase knowledge of and interest in ocean exploration through Remotely Operated Vehicles (ROVs), surveying and seafloor mapping. The Junior Oceanographer camp, designed for children ages 7-9, will include themes of sanctuary-specific biodiversity and habitats, as well as navigational activities. Ultimately, it is the hope that these camps will promote ocean literacy and thus, foster lifelong ocean stewards.

Sanctuary Hosts Peninsula College Marine Biology Class

Twenty students from Barbara Blackie's marine biology class at Peninsula College in Port Angeles, WA visited the Olympic Coast National Marine Sanctuary classroom. Students learned about seabird biology and the importance of monitoring the environment through citizen science-based programs like the Coastal Observation and Seabird Survey Team (COASST). They also divided into two groups for a guided tour of the Olympic Coast Discovery Center to learn about NOAA's national marine sanctuaries, particularly OCNMS and the marine mammals inhabiting the sanctuary.



Marine Protected Areas Federal Advisory Council Meeting in Tacoma

On June 2-3, the Marine Protected Areas Federal Advisory Council, which advises NOAA and Department of Interior on issues related to marine protected areas, met in Tacoma, Washington to evaluate ways to strengthen and expand the nation's system of marine protected areas. As part of learning about the Pacific Northwest, they listened to presentations by five speakers on "Marine Protected Areas and Issues in the Pacific Northwest," including a presentation by sanctuary Superintendent Carol Bernthal on critical issues, challenges, and opportunities facing Olympic Coast National Marine Sanctuary.

ROV Club Year Culminates at Kitsap Underwater Robotics Competition

Olympic Coast National Marine Sanctuary, in partnership with Feiro Marine Life Center, conducted a nine month Remotely Operated Vehicle (ROV) after-school club, which culminated with participation in the Kitsap Underwater Robotics Competition on Saturday, May 30 in Bremerton. Three teams from the club attended their first competition: one high school team, and two middle school teams. The high school team placed fourth out of eleven teams in the competition. The two middle school teams placed seventh and eleventh out of 25 teams. Wayne Roberts, volunteer club mentor, received the special teacher award for his outstanding mentorship of the young ROV enthusiasts. The club will resume in the fall after summer break.



Ocean Science Field Education for 400 Olympic Coast Students



Olympic Coast National Marine Sanctuary, in partnership with Feiro Marine Life Center and Seattle Aquarium, conducted another successful year of ocean science education with Washington coastal schools. Nine schools and twenty-one teachers participated in the ocean science program, which provided hands-on experiential learning opportunities to approximately 400 students and 57 parent chaperones from Washington's coast. Participating schools enjoyed a classroom visit focusing on intertidal monitoring, marine debris and watersheds, followed by a field trip to their local beach for intertidal monitoring and exploration or sand exploration activities, depending on the type of intertidal beaches available to them. Students also learned how to conduct NOAA marine debris surveys, including debris sorting, classifying and weighing activities. Schools were given the opportunity to make a second

field trip, either to Feiro Marine Life Center or the Seattle Aquarium. Participating schools included Clallam Bay, Quileute Tribal School, Queets Clearwater, Lake Quinault, Taholah, Pacific Beach, Ocosta, Ocean Shores and Simpson. Ocean science is designed to integrate NOAA ocean literacy concepts and principles into western Washington formal and informal educational programs.

This year, OCNMS added a new classroom component for five outer coast schools participating in Ocean Science programs, including Clallam-Bay, Quileute, Queets-Clearwater, Lake Quinault and Ocean Shores. More than 150 students from grades K-8 participated in lessons and activities covering the national marine sanctuary system and OCNMS, watershed health, food webs, marine debris and tidal monitoring to prepare them for their Ocean Science beach field investigations. Ocean Science is a collaborative effort between Feiro Marine Life Center, Olympic Coast National Marine Sanctuary and Seattle Aquarium, supported by North Pacific Coast and Grays Harbor marine resource committees, as well as NOAA's Marine Debris Program and B-WET.



Ocean Acidification Education Presented at Teacher Professional Development Workshop

As part of a teacher professional development workshop, Olympic Coast National Marine Sanctuary education staff presented an overview of the sanctuary, followed by a presentation on ocean acidification "The Ocean's Recipe for Success." With partners at NatureBridge Olympic, twenty-six regional teachers learned about the "ingredients" needed for a healthy ocean, and the causes and impacts of ocean acidification and our changing ocean. Engaging activities and games provided teachers with multiple options to introduce ocean acidification in the classroom, including with NOAA resources and educational curriculum.

Successful North Olympic Watershed (NOW) Science Program with Local Schools



Olympic Coast National Marine Sanctuary, in partnership with Feiro Marine Life Center and Olympic National Park, engaged all fifth grade classrooms from Sequim, Port Angeles and Crescent school districts in the North Olympic Watershed (NOW) science program. This year fifth grade students from East Port Orchard joined the program as well. Students participated in a full day of experiential learning, including a walk along Peabody Creek watershed to collect water quality data and make observations. Students worked with sanctuary educators to make the global connection between ocean currents and marine debris through conducting dissections and examinations of albatross boluses. At the end of their experience, students discussed some of the actions we can take in our communities to help eliminate

debris from entering our watersheds and ocean. NOW Science is funded in part by Haller Foundation, Port Angeles School District and Washington Department of Fish and Wildlife ALEA program, and is supported by the City of Port Angeles. The program reached a total of 582 students and twenty-six teachers, along with many chaperones.

First Graders Conduct Field Trip on Ocean, Weather and Marine Debris

Twenty-four first grade students from Jefferson Elementary School in Port Angeles, WA went on an educational field trip, hosted by Olympic Coast National Marine Sanctuary, to conclude their school year. Students toured Olympic Coast Discovery Center and discussed marine debris and how weather sends litter on land into the ocean. They also participated in fun activities, such as a marine debris relay and entanglement exercise. After their time with OCNMS, students visited Feiro Marine Life Center to observe some of the local marine animals and organisms and have hands-on experience with marine animals in the touch tanks.

Kids Day at Dungeness National Wildlife Refuge's Centennial Celebration

Education staff from Olympic Coast National Marine Sanctuary provided a booth and activity for a free Kids Day event to celebrate 100 years of protection at Dungeness National Wildlife Refuge. More than 200 kids attended the event with their families, and toured the exhibits with a "passport" that guided them on a journey to learn about wildlife and habitats of the Olympic Peninsula and Washington coast, while gathering souvenirs and a nature kit to help them explore nature beyond the event. At the sanctuary's exhibit, families learned about sea otters while examining a sea otter pelt and replica skull. Kids also had the opportunity to make sea otter puppets and take home educational coloring books on the differences between sea otters and river otters, provided by The Oceanographic Environmental Research Society (OERS). Other activities were provided by Friends of Dungeness National Wildlife Refuge, Leave No Trace Center for Outdoor Ethics, New Dungeness Light Station Association, Olympic National Park and Quilcene National Fish Hatchery.

Junior Oceanographer Summer Camps Engage Youth



Olympic Coast National Marine Sanctuary Hollings Scholar Billie Case co-developed and co-led summer camp programs for youth with Feiro Marine Life Center. During the four-day camp, children ages 7-9 learned about the marine life of four different Olympic Coast ocean habitats through explorative and hands-on activities. Each day, campers learned about the organisms and conditions of diverse marine environments, including the intertidal zone, kelp forests, open ocean and deep sea. At the end of each day, campers reflected on what they learned and created their own designs of creatures to an ocean mural. Children then presented their parents with the mural, and their personal crafts, at the camp's conclusion.

Another four-day summer camp, for youth ages 10-12, used explorative and hands-on activities to learn about regional marine life, as well as nautical history and technology. Looking at both human history and marine organism adaptations, campers learned about communication, navigation and exploration techniques within the ocean realm.

Get Into Your Sanctuary Day with "Healthy Ocean, Healthy You" Activities

On June 27, Olympic Coast National Marine Sanctuary staff and partners celebrated Get Into Your Sanctuary Day with "Healthy Ocean, Healthy You" activities at Kalaloch Lodge and beach. Poser Yoga kicked off the event with a morning beach yoga practice with a marine theme, led by Karlyn Langjahr. Sanctuary staff and members of Surfrider Foundation's Olympic Chapter led a mid-day beach cleanup. Lynne Barre, from NOAA Fisheries, displayed the life-sized inflatable southern resident killer whale, "Mike," from J-Pod, for lodge visitors to enjoy. Lynne and sanctuary staff were on hand to talk about orcas and sanctuary-related information. In the afternoon, Lynne presented on the southern resident killer whales population, highlighting new data collected via radio satellite tagging, and their use of sanctuary waters. At the end of the day, Kalaloch Lodge restaurant, a member of the Olympic Culinary Loop, offered dinner specials that promoted sustainable seafood. Partners included National Marine Sanctuary Foundation, Kalaloch Lodge, NOAA Fisheries, Surfrider Foundation, Poser Yoga, Olympic Culinary Loop and Olympic National Park.



Washington State Coastal Teachers Participate in Education and Action Workshop



On July 6-8, Olympic Coast National Marine Sanctuary in partnership with Pacific Education Institute (PEI) and Feiro Marine Life Center, hosted fifteen teachers for the "Ocean Science Trash-Free Seas: Education and Action" teacher workshop. Using marine debris surveys as the field investigation tool, teachers were provided with lessons, activities, and performance tasks aligned with Next Generation Science Standards (NGSS) and Common Core English Language Arts (ELA) standards to integrate into their classrooms. With marine debris as the focus, teachers were encouraged to bring storytelling into the classrooms, with a variety of digital tools available, including Imovie, Windows Movie Maker, and Animoto. Viola Reibe, Hoh Indian Tribe storyteller, introduced the power of story. Teachers were trained in the NOAA Marine Debris protocol, and introduced to Coastal

Observation and Seabird Survey Team marine debris protocol, and had the opportunity to practice both on the shoreline of OCNMS. Local marine debris artist Sarah Tucker provided a hands-on art experience using debris collected off Olympic Coast, and provided tips on working with debris as an art medium in the classroom.

Student Conservation Association Crew Leaders learn About Marine Debris

In collaboration with Olympic National Park, Olympic Coast National Marine Sanctuary gave a two-hour training to six Student Conservation Association crew leaders who will be removing marine debris from Olympic Coast. Crew leaders will be assisted by volunteer high school students. Crew leaders toured the Olympic Coast Discover Center and learned about marine debris monitoring and identification in the classroom.

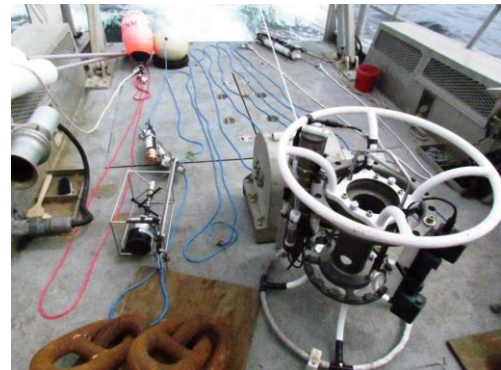
CONDUCT COLLABORATIVE RESEARCH, ASSESSMENTS AND MONITORING TO INFORM ECOSYSTEM-BASED MANAGEMENT

Researchers Discuss Resuming Subtidal Community Surveys

Olympic Coast Sanctuary Acting Research Coordinator and NOAA scientists at the Northwest Fisheries Science Center met to discuss potential research collaborations in nearshore waters and deep sea canyons. Planning has been initiated to revisit subtidal SCUBA transects established in 1987, and surveyed again in 1995 and 1997, to document changes in sea otter prey resources. The aim is to identify potential association between prey and sea otter population growth and range expansion off Washington's outer coast. In 1970, 59 sea otters were reintroduced to Washington. Since then, their population has grown to over 1,200 individuals, including significant expansion of their foraging range. Sea otters are a keystone species with significant influence on nearshore kelp habitat, macrofauna and ecosystem functions. These historic surveys also generated some of the only data available for subtidal sea star distribution and abundance, information of special interest in light of the population-level impacts of sea star wasting disease recently documented along on the eastern Pacific coastline. Discussions also focused on collaborations for harmful algal bloom monitoring, the use of the sanctuary's research vessel and a strategy to support future exploration of deep sea habitats of the Quinault Canyon. Quinault Canyon is an unexplored area with potential for significant biogenic habitat and a site of coastal upwelling where nearshore hypoxia events may originate and nutrient rich waters fuel coastal productivity in summer months.

Sanctuary Deploys Oceanographic Moorings for 2015 Field Season

Olympic Coast National Marine Sanctuary commenced the 2015 summer field season and its oceanographic mooring program with deployment of instrumented buoys between Makah Bay and Cape Elizabeth off the Washington coast. This program was initiated in 2000 to monitor water quality and currents, plankton density (including harmful algal blooms), upwelling and low oxygen events that affect marine life, as well as human health in the region. Ten mooring buoys are positioned in nearshore waters at 15 and 42 meters depth at five locations along the 135 mile sanctuary coastline. The mooring buoys were deployed from the sanctuary's research vessel, RV *Tatoosh*, in late May and will be recovered in early October before harsh winter ocean conditions develop. Data collected includes ocean temperature, conductivity (salinity), current velocity and direction, dissolved oxygen, fluorescence (a proxy for plankton) and turbidity.



NOAA Ship *Okeanos Explorer* Conducts Quick Habitat Survey of Sanctuary

Olympic Coast National Marine Sanctuary received unexpected support from NOAA ship, *Okeanos Explorer*, which was transiting the Washington Coast en route to make repairs in a Puget Sound shipyard. The vessel offered their assistance to conduct a limited multibeam survey in the sanctuary. Data from the vessel's high resolution bathymetric survey system is ideal for helping the sanctuary with its habitat mapping efforts. For more information about how the sanctuary uses this technology, see olympiccoast.noaa.gov/science/habitatmapping/habitatmapping.html.

NOAA Leads West Coast Surveys for Harmful Algal Blooms

NOAA Fisheries mobilized a fisheries survey running between June and September 2015 aboard the NOAA ship, *Bell M. Shimada*, including charting of an extensive harmful algal bloom (HAB) that spans much of the West Coast. Stretching from the Central California Coast north to Washington and possibly Alaska, the HAB event involves some of the highest concentrations of the algal toxin domoic acid observed in the last decade in plankton and plankton-eating fish. Researchers will sample algae and toxins, including the diatom alga *Pseudo-nitzschia* and the potent neurotoxin it produces, domoic acid. When organisms consume toxic *Pseudo-nitzschia*, domoic acid accumulates in their tissue. Harvesting and fishing bans for molluscan shellfish, crabs and some fish have been instituted along much of the West Coast. Shellfish harvesting bans protect human consumers from Amnesic Shellfish Poisoning caused by domoic acid. Sardines, anchovy and other planktivorous fish that feed on the algae can also accumulate domoic acid, in turn poisoning birds and sea lions that feed on them. Marine mammal and bird impacts are anticipated along the West Coast. Scientists believe that these HABs, the first domoic acid

HAB events in nine years on the Washington State outer coast, may be associated with the warm water offshore known as “The Blob.”

These surveys support a National Centers for Coastal Ocean Science sponsored Ecology and Oceanography of Harmful Algal Blooms project in southern and central California comparing coastal HAB “hot spots” water samples collected during the survey for algae and toxins. The “hot spots” project is a \$4 million, five-year effort to determine why HAB hot spots exist and how human influences, such as nutrient runoff, and natural upwelling of deep ocean water interact to cause blooms. With a focus primarily on toxic *Pseudo-nitzschia*, it also monitors for toxic *Alexandrium catenella* and other HABs that commonly occur in the region. Similar research and monitoring is conducted along the Washington coast by the Olympic Region Harmful Algal Bloom or ORHAB partnership. The purpose is to improve monitoring and develop predictive models for the early warning of HABs and their impacts as part of a larger effort by NOAA and partners to develop ecological forecasts.

Current and Former Sanctuary Staff Assist with Annual Sea Otter Census

Liam Antrim, OCNMS Acting Research Coordinator, joined Ed Bowlby, retired OCNMS Research Coordinator, Mary Sue Brancato, former OCNMS Resource Protection Specialist, Jessie Hale, Nancy Foster Scholar, and Shelly Ament, Washington Department of Fish and Wildlife, to conduct land-based counts of sea otters for the annual census jointly coordinated by state and federal departments of Fish and Wildlife. This annual census is conducted in support of sea otter recovery efforts. The sea otter population on the outer Washington coast numbers over 1,000 individuals, and predominantly occurs within the sanctuary. This population has grown from a few dozen individuals translocated from Alaska approximately 45 years ago, an effort to restore the extirpated Washington sea otters. Land-based observers at several remote locations conduct accurate otter counts over a three-day period, which are used to correct counts from aerial surveys flown over the entire coast.



Emerging Research on Ocean Acidification in Washington State Waters

On June 26, sanctuary staff attended a 2015 Science Symposium hosted by the University of Washington’s Ocean Acidification Center. The day-long symposium focused on presentations by regional experts, with results of field observations, biological experiments, modeling and forecasting and other research relevant to ocean acidification in Washington’s waters. Presentations were followed by a plenary discussion of emerging science and critical information gaps. The symposium provided a great networking opportunity for those working on ocean acidification research.

CONSERVE NATURAL RESOURCES IN THE SANCTUARY

NOAA Marine Debris Monitoring Field Day in Olympic Coast Sanctuary

NOAA Marine Debris Program staff Sherry Lippiatt, California Regional Coordinator, Carlie Herring, Research Coordinator, and Heidi Pedersen, OCNMS, conducted a field day to coordinate data convergence from two citizen science-based marine debris monitoring protocols. Joining them were Kathryn Hobart, NOAA Hollings Scholar, OCNMS, and Hillary Burgess, UW/Coastal Observation and Seabird Survey Team Marine Debris. The objective is to have data from COASST Marine Debris feed directly into the NOAA Marine Debris Program’s national database.

Sanctuary to Investigate Ocean Dumping

The Office of National Marine Sanctuaries authorized the investigation of reported ocean dumping in the vicinity of Cape Flattery in the Makah Tribe usual and accustomed fishing area. In 2013, a Makah fisherman pulled up several crushed cars in his trawl net. A survey is being planned to relocate this debris, to determine if additional material has been dumped in the vicinity and to document any damages to natural or cultural resources.

UNDERSTANDING THE SANCTUARY’S CULTURAL, HISTORICAL AND SOCIOECONOMIC SIGNIFICANCE

Sanctuary Provides Information to Ancestor of Shipwreck Survivor

The great-great-grandson of shipwreck survivors of the Steamship *Southerner* contacted Olympic Coast National Marine Sanctuary to inquire about details from the 1854 incident. The family was uncertain as to who from their family was onboard. Robert Schwemmer, West Coast Regional Maritime Heritage Coordinator, provided a copy of an 1855 newspaper that listed the names of the twenty-five passengers and twenty-six crew members. Everyone on the ship survived, including the inquirer’s great-great-grandparent and three of their children. The story of the SS *Southerner* is significant not only for early settlers to the Pacific Northwest, but for the Quileute Tribe whose ancestors provided aid to the survivors. For more about the

SS *Southerner*, and other important shipwrecks that are a part of the Olympic Coast's history, see: olympiccoast.noaa.gov/living/historyandculture/shipwrecks/shipwrecks.html.

SANCTUARY PERMITTING

OCNMS-2011-003-Amendment 2 – Heather Reed, Washington Department of Fish and Wildlife (WDFW)

Project Title: Coastal razor clam population assessment, Dungeness crab management, enforcement and derelict gear recovery surveys in the Olympic Coast National Marine Sanctuary.

Permitted Activity: Low altitude overflights to locate derelict crab gear

Project Location: Quileute Tribe Special Management Area roughly between La Push and Destruction Island; specifically in offshore waters bounded on the north by a line extending from 47° 54' N, 124° 24' W to 47° 54' N, 124° 54' W; on the south by a line extending from 47° 40' N, 124° 24' W to 47° 40' N, 124° 45' W; on the east the area will follow the 5 fathom line, and on the west the area will follow roughly the 35 fathom line.

Permit Duration: Through July 2017, or beyond if permit is renewed

Comment: This permit amendment will support The Nature Conservancy/Quileute Tribe partnership for derelict crab pot removal. WDFW's permit already covers this activity and was modified in 2014 to cover a similar The Nature Conservancy/Quinault Nation partnership.

Permit Inquiries

1. On May 19, 2015, an application was received for helicopter flights to/from Tatoosh Island to set up a temporary, amateur radio broadcast. Permission for access to the island was not granted by the Makah Tribe, and no sanctuary permit was issued.
2. On June 26, 2015, an inquiry about permitting requirements was received concerning a Canadian-led survey in the northern sanctuary for herring stock assessment surveys. All sampling was from the water column (mid-water trawls, fish-finder sonar, water column chemistry profiles). Because there is no intersection with sanctuary regulations or prohibitions, a sanctuary permit is not required for the survey.

LEARN ABOUT YOUR SANCTUARY / NATURAL HISTORY

Drought Relief in Washington's Southwest Watersheds

Washington Department of Ecology is providing drought relief in four of twenty Southwest Watersheds (Figure 1): — Elwha/Dungeness, Lyre/Hoko, Sol Duc/Hoh and Queets/Quinault basins — where dramatic effects are already seen in the third month since the declaration of drought. Relief is focused on mitigating the impacts of reduced stream flows and high water temperatures on fish, and reducing hardships on agriculture in areas that rely on surface water for irrigation.

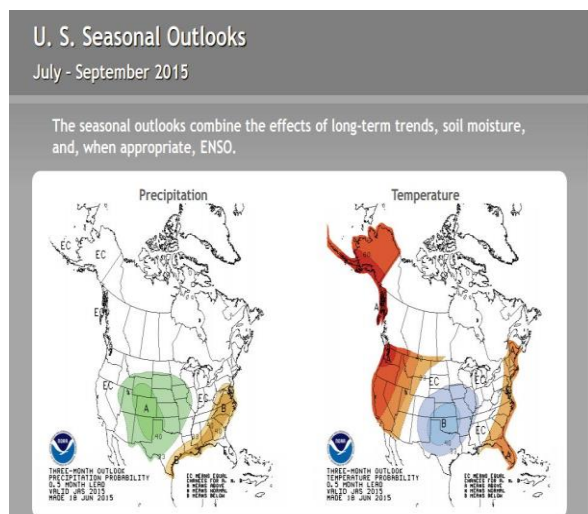


Figure 2: Seasonal forecast from NOAA's Climate Prediction Center July 6 2015 report.



The Western Regional Climate Center, a partnership between NOAA and Washington State science centers, is also tracking the drought using a historic temperature dataset that began in January 1895 to establish a Standardized Precipitation Index (SPI). From the SPI, scientists calculate relative departures from average precipitation and detect long term climate trends that may indicate climate variation. They estimate that the Southwest Watersheds show a departure from average rainfall of -9 to -12 inches of rainfall over the past three months:

www.wrcc.dri.edu/cgi-bin/anomimage.pl?was90dTvdep.gif.

Figure 1: The Southwest Watersheds. The Southwest Watersheds began in January 1895 to establish a Standardized Precipitation Index (SPI). From the SPI, scientists calculate relative departures from average precipitation and detect long term climate trends that may indicate climate variation. They estimate that the Southwest Watersheds show a departure from average rainfall of -9 to -12 inches of rainfall over the past three months:

The NOAA Climate Prediction Center produces a weekly Expert Discussion and Assessment of existing El Niño conditions. The July 6, 2015 report (Figure 2) summarizes the effects of the current El Niño, which is predicted to last through 2016: www.cpc.ncep.noaa.gov.

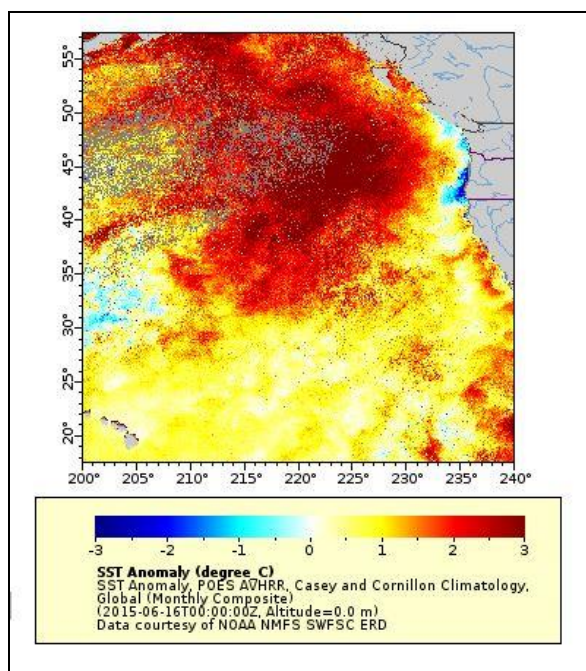
Sea Surface Temperature Blob Changing the Northeastern Pacific

The mass of warm water that began as a small area off the coast of Alaska in 2013 has grown to more than 500 miles across the outer coast of Washington. A second smaller mass off the coast of Baja California, Mexico and southern California also persists. These masses consist of water that is roughly 5 degrees Fahrenheit warmer than the typical ocean temperature — the largest, warmest and most persistent sea surface temperature anomaly in the historical record. The temperature anomaly is not limited to the sea surface; in some areas the temperatures remain warm to a depth of 100 meters or more.

This mass of warm water, called “the blob,” was at first considered a strong El Niño, although it was quickly determined to have no link to conditions at the equator. Washington State Climatologist Nicholas Bond and colleagues relate the warming

to an unusual weather pattern that developed over a huge region of the earth in the fall of 2013, extending from the northern Pacific across North America. The pattern featured a higher-than-normal pressure ridge off the coast of the Pacific Northwest, reducing the number and intensity of storms that made landfall and diverting cold Canadian air into the middle and eastern U.S.¹ The warmer temperatures are not due to more heating, but less winter cooling.

Top marine predators, such as seabirds, are particularly sensitive to changes in oceanographic conditions. Shifts in seabird distribution, changes in breeding and migration, reproductive failure, and even severe mortality have been linked to changes in ocean temperature, stratification, currents and other physical factors. Recent seabird observations from the Southern Hemisphere, equatorial and central-north Pacific suggest an impending climate shift. The initial signals provided by declines in the breeding success and chick size of sooty shearwaters (*Puffinus griseus*) may suggest broad-scale ecosystem impacts.² In the past, studies of seabirds have provided insight into strong El Niño events. NOAA’s Climate Prediction Center confirms the persistence of a strong El Niño through 2016³ which will add to the abnormal oceanographic conditions that are altering marine life in the Northeastern Pacific.



Satellite Imagery

The satellite imagery is Sea Surface Temperature (SST) anomaly from the NOAA Polar-orbiting Operational Environmental Spacecraft (POES) Advanced Very High Resolution Radiometer (AVHRR) sensor using a monthly composite. NOAA CoastWatch SST anomaly data shows the difference between the surface temperature at a given time and the temperature that is normal for that time of year.

REGIONAL / NATIONAL MARINE SANCTUARY SYSTEM NEWS

California Oil Spill Near Channel Islands National Marine Sanctuary

On May 19, the Office of Response and Restoration (OR&R) was notified of a 24-inch pipeline rupture that occurred earlier in the day near Refugio State Beach in Santa Barbara County, California. OR&R responded at the scene by providing information on the fate and effects of the crude oil and potential environmental impacts both in the water and on the shore. They also supported the Joint Information Center and provided a vessel for use by the California Department of Fish and Wildlife. The pipeline break released approximately 105,000 gallons of oil, with



¹ William Peterson, Marie Robert & Nicholas Bond. The warm blob – Conditions in the northeastern Pacific Ocean. PICES Press Vol. 23, No. 1. North Pacific Marine Science Organization.

² G.R.W. Humphries, E. Velarde, D.W. Anderson, B. Haase & W.J. Sydeman. Seabirds as early warning indicators of climate events in the Pacific. PICES Press Vol. 23, No. 1. North Pacific Marine Science Organization.

³ http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/ens0_advisory/ensodisc.html.

21,000 gallons flowing into the Pacific Ocean, threatening the rich marine resources along the Southern California coast. The source was secured, but oil in the ocean consisted of patches, streaks and tarballs of various sizes and thicknesses, from both the spill and natural oil seeps in the area. OR&R provided overflight observations of the spill, information on fate and effects of the crude oil, potential environmental impacts both in the water and on the shore and observation and data management for the Natural Resource Damage Assessment (NRDA). Integrated Ocean Observing System (IOOS®) partners provided high-frequency radar (HFR) data to assist in tracking the spill. The Southern California Coastal Ocean Observing System (SCCOOS) established a temporary HFR site to fill in coverage north of the spill. The Office of National Marine Sanctuaries provided personnel and vessel support to both response and NRDA activities, including support of wildlife operations, the Joint Information Center, NRDA shoreline assessments and provided a platform for operating Unmanned Aircraft Systems for NRDA. Cleanup efforts continued along the beach, in the water and inland. To learn more about the spill, please refer to the NOAA Incident website, incidentnews.noaa.gov/incident/8934.

GFNMS and CBNMS Expansions in Place

Effective June 9, 2015, Gulf of the Farallones and Cordell Bank national marine sanctuaries (GFNMS and CBNMS) have expanded. Regulations are now in effect, which include the new boundaries for both sites, the revised terms of designation, and updated management plans. The expanded boundaries of GFNMS include approximately 3,295 square miles and the expanded boundaries of CBNMS now include approximately 1,286 square miles. This action added nationally-significant resources and habitats to the National Marine Sanctuary System, including the nutrient-rich ocean upwelling zone originating off Point Arena, one of the most intense and productive upwellings in North America; important habitats and subsea features; and numerous submerged historical resources. The area supports a rich, productive marine food web.

As a result of the expansion, Gulf of the Farallones National Marine Sanctuary is now known as Greater Farallones National Marine Sanctuary. The name change reflects the sanctuary's new geographical boundaries and expanded opportunities for stewardship, research and education.

On June 28, NOAA celebrated by hosting an event in Gualala, CA, which included speakers, activities and music. This event was one of a series of "Get Into Your Sanctuary" Day events being held across the National Marine Sanctuary System over the weekend of June 27-28, 2015. For more information, see farallones.noaa.gov/manage/expansion_cbgf.html and cordellbank.noaa.gov/news/expansion.html.

Stellwagen Bank NMS at Forefront of New Marine Mammal Protected Areas Network

A recent workshop in St. Maarten, Dutch Caribbean, gathered managers from Stellwagen Bank National Marine Sanctuary, Agoa Marine Mammal Sanctuary in the French Antilles and the Dutch Caribbean Marine Parks. The workshop's goal was to develop a common plan of action to implement future cooperation on marine mammal conservation. To share the experience of marine mammal management within protected areas, the participants decided to establish a new "Marine Mammals Protected Areas Network" focusing on topics such as common protocols for acoustic monitoring, development of a common stranding database, publication of guidelines for whale watching and capacity building for stranding and disentanglement.

Report on Economic Benefits of Recreational Fishing in California's National Marine Sanctuaries

On June 22, the Office of National Marine Sanctuaries released a report, "The Economic Impact of the Recreational Fisheries on Local County Economies in California National Marine Sanctuaries, 2010, 2011 and 2012." A press release announced the report, highlighting the positive effects and economic value of recreational fishing in the four California sanctuaries: Channel Islands, Greater Farallones, Cordell Bank and Monterey Bay. Approximately 13.4% of all saltwater recreational fishing in California from 2010 to 2012 took place in national marine sanctuaries. Anglers spent approximately \$156 million on saltwater recreational fishing in California's four national marine sanctuaries on average, which generated more than \$200 million in annual economic output and supported nearly 1,400 jobs. The complete California recreational fishing economic impacts study, along with earlier national marine sanctuary socioeconomic reports, can be found at sanctuaries.noaa.gov/science/socioeconomic/pdfs/california_rec_sanctuaries.pdf.

MARINE-RELATED NEWS COVERAGE

Is Noise From Navy Jets a Threat to Olympic National Park? Representative Derek Kilmer Wants Soundings

"U.S. Rep. Derek Kilmer, D-Wash., who represents the Olympic Peninsula, wants to know if these sounds — and silences — are threatened by the U.S. Navy's interest in using areas of the Peninsula for electronic warfare range testing, with an increased number of jets flying over pristine places."

blog.seattlepi.com/seattlepolitics/2015/05/11/is-noise-from-navy-jets-a-threat-to-olympic-national-park-kilmer-wants-soundings/

NOAA Focuses on J, K and L Pods' Survival

“The southern resident killer whales – J, K and L pods – are considered by NOAA to be among the eight species most at risk of extinction in the near future. NOAA has launched the ‘Species in the Spotlight: Survive to Thrive’ initiative, a concerted agency-wide effort to spotlight and save these highly at-risk species.”

sanjuanislander.com/index.php?option=com_k2&view=item&id=18983:noaa-focuses-on-j-k-and-l-pods-survival&Itemid=10973

Permit for Expanded Electronic-Warfare Training on Olympic Peninsula Delayed

“The U.S. Forest Service says a flood of public comments is delaying its decision on whether to grant the Navy a permit for expanded electronic-warfare training on the Olympic Peninsula.”

www.oregonlive.com/today/index.ssf/2015/05/permit_for_expanded_electronic.html#incart_river

Death of Two Endangered Sea Otters at Long Beach Sparks Inquiry

“Two dead northern sea otters have washed up on Long Beach in recent weeks, a surprise since the marine mammals — which are classified as endangered in Washington state — were known to live here.”

www.chinookobserver.com/co/local-news/20150528/death-of-two-endangered-sea-otters-at-long-beach-sparks-inquiry

The Olympic Peninsula Faces A Summer Without Snowmelt

“The peaks of the Olympic Mountains are a familiar sight on the western horizon for people in the Puget Sound region. Well into summer, those mountains are usually snowy white. But not this year. The snow is gone and rivers are at flow levels not normally seen until late summer. That has farmers, fish managers and community leaders worried about the season ahead.”

www.opb.org/news/article/the-olympic-peninsula-faces-a-summer-without-snowmelt

Baby Orca Presumed Dead is Alive and Healthy

“An orca calf that experts feared had died or was lost at sea is alive and healthy. It was spotted off the coast of British Columbia with its family.”

www.king5.com/story/news/local/2015/06/02/baby-orca-presumed-dead-is-alive-and-healthy/28384199/

The Baffling, Gruesome Plague That is Causing Sea Stars to Tear Themselves to Pieces

“Allison Gong is a marine biologist, so she knows perfectly well that a sea star has no blood, brain, or central nervous system. Still, she can't help thinking of the stars in her lab as pets. ‘Because of my weird personality,’ she told me, ‘I form an emotional attachment, even though obviously they can't reciprocate.’”

www.vice.com/read/the-wasting-0000650-v22n5

Google Brings the World's Coral Reefs to Your Screen

“Most of us will never swim with the giant ocean sunfish off the coast of Bali or tag alongside a humpback whale in the Cook Islands. But thanks to Google Maps, you can have a virtual view of the experience.”

www.cbsnews.com/news/google-brings-worlds-coral-reefs-to-your-screen

The Buoys are Back: Undersea Instruments Help Predict Salmon Runs

“Olympic Coast Marine Sanctuary scientists have sunk 10 monitors beneath the waves to take water temperatures at various depths along the 135-mile-long protected shore. Sure, they understand the water is chilly. What they want to learn is if it's cold enough – specifically, does the water rising shoreward from the cold depths to the surface bring sufficient nutrients to supply the food chain that allows salmon and other creatures to thrive.”

www.peninsuladailynews.com/article/20150614/NEWS/306149999

Toxic Algae Bloom May Stretch From California to Alaska

“The largest West Coast toxic algae bloom in more than decade may stretch from Central California to Alaska. NOAA says it is mobilizing more scientists to study and chart the bloom which has led to the closure of several fisheries along the West Coast.”

www.king5.com/story/tech/science/environment/2015/06/15/west-coast-toxic-algae-bloom/71264756/

Warming Northwest Rivers Raise Risk of Fish Kills

“It's been a one-two punch of low snowpack last winter and not enough rain this spring for many Northwest rivers. Warm temperatures and low river flows are causing problems for salmon making the return migration.”

kuow.org/post/warming-northwest-rivers-raise-risk-fish-kills

NOAA Fisheries Mobilizes as Unprecedented Toxic Algal Bloom Shuts Down West Coast Shellfish Fisheries

“The largest harmful West Coast algal bloom in more than a decade is closing shellfish fisheries in Washington, Oregon and California and has NOAA Fisheries’ Northwest Fisheries Science Center in Seattle scrambling to chart the extent of the threat.”

lincolncountydispatch.com/index.php/news/item/5020-noaa-fisheries-mobilizes-as-unprecedented-toxic-algal-bloom-shuts-down-west-coast-shellfish-fisheries

New Study Shows Arctic Ocean Rapidly Becoming More Corrosive to Marine Species

“New research by NOAA, University of Alaska, and Woods Hole Oceanographic Institution in the journal ‘Oceanography’ shows that surface waters of the Chukchi and Beaufort Seas reach levels of acidity that threaten the ability of animals to build and maintain their shells by 2013, with the Bering Sea reaching this level of acidity by 2044.”

research.noaa.gov/News/NewsArchive/LatestNews/TabId/684/ArtMID/1768/ArticleID/11240/New-study-shows-Arctic-Ocean-rapidly-becoming-more-corrosive-to-marine-species.aspx

Algae Bloom Hits Dungeness Crabbers Hard On Washington Coast

“Tom Petersen’s fifty-foot crab boat sits idly in the Port of Willapa Harbor, a tiny coastal inlet forty or so miles north of the mouth of the Columbia River. On a normal day in summer, Petersen would be selling Dungeness crab to canneries, big-city buyers and even fresh off the back of his boat to locals and tourists.”

kuow.org/post/algae-bloom-hits-dungeness-crabbers-hard-washington-coast

Researchers Study Plumes of Algae in Sequim Discovery Bays

“An algae strain capable of producing a potentially deadly biotoxin rarely found on the North Olympic Peninsula has been found in large quantities in both Sequim and Discovery bays. The marine algae has produced biotoxins in Sequim Bay, but not to the level that represents a public health risk, researchers said.”

peninsuladailynews.com/article/20150626/NEWS/306269973/researchers-study-plumes-of-algae-in-sequim-discovery-bays

2014 Breaks Heat Record, Challenging Global Warming Skeptics

“Last year was the hottest on earth since record-keeping began in 1880, scientists reported on Friday, underscoring warnings about the risks of runaway greenhouse gas emissions and undermining claims by climate change contrarians that global warming had somehow stopped.”

www.nytimes.com/2015/01/17/science/earth/2014-was-hottest-year-on-record-surpassing-2010.html?emc=edit_na_20150116&nliid=60140390&r=0

Port Angeles Considering Stricter City Water Curbs to Protect Fish; Other Sources Studied

“City officials are pondering imposition of stricter, Stage 3 water conservation measures within the next three weeks as the Elwha River flows slower and slower during the North Olympic Peninsula’s rainless summer, Craig Fulton, city public works and utilities director, said Wednesday.”

www.peninsuladailynews.com/article/20150709/news/307099979/port-angeles-considering-stricter-city-water-curbs-to-protect-fish

Scientists Predict Huge Sea Level Rise Even if We Limit Climate Change

“Even if world manages to limit global warming to 2C — the target number for current climate negotiations — sea levels may still rise at least 6 meters (20 ft) above their current heights, radically reshaping the world’s coastline and affecting millions in the process.”

www.theguardian.com/environment/2015/jul/10/scientists-predict-huge-sea-level-rise-even-if-we-limit-climate-change?utm_medium=twitter&utm_source=dlvr.it

Impending Drought Raises Concerns About Elwha River Fish

“It’s all about fish that are slowly returning to the Elwha River following the removal of two dams. They must be protected from the drought, city and Lower Elwha Klallam tribal officials said last week.”

www.peninsuladailynews.com/article/20150713/news/307139978/impending-drought-raises-concerns-about-elwha-river-fish

OCNMS ONLINE

Visit our website at: <http://olympiccoast.noaa.gov/>.

Follow us on Facebook and Twitter!

<https://www.facebook.com/usolympiccoastgov>

<https://twitter.com/olympiccoast>

Please take a few moments to peruse the site. Your feedback is greatly appreciated.

Comments and suggestions can be sent to:

Jacqueline.Laverdure@noaa.gov.

FUN, OCEAN-RELATED WEBSITES

National Oceanic and Atmospheric Administration

<http://www.noaa.gov/>

National Ocean Service

<http://www.nos.noaa.gov/>

Office of National Marine Sanctuaries

<http://www.sanctuaries.nos.noaa.gov/>

NOAA Marine Debris Program

<http://marinedebris.noaa.gov/>

NOAA Online Media Library

<http://sanctuaries.noaa.gov/photos>

Encyclopedia of National Marine Sanctuaries

<http://www8.nos.noaa.gov/onms/park/>

NOAA Ocean Explorer

<http://oceanexplorer.noaa.gov/>

National Data Buoy Center

<http://www.ndbc.noaa.gov/rmd.shtml>

Washington's Ocean Resources

<http://www.ecy.wa.gov/programs/sea/ocean/index.html>

CoastWatch – West Coast Regional Node

<http://coastwatch.pfel.noaa.gov/>

Northwest Association of Networked Ocean Observing Systems

<http://www.nanoos.org/>

NOAA's Pacific Marine Environmental Laboratory

<http://www.pmel.noaa.gov/>

OLYMPIC COAST NATIONAL MARINE SANCTUARY

Learn More About Your Sanctuary

The Sanctuary Office Report is produced bi-monthly by Olympic Coast National Marine Sanctuary in conjunction with sanctuary advisory council meetings. To learn more about the sanctuary, please visit our website at:

<http://www.olympiccoast.noaa.gov>.

To learn more about the sanctuary advisory council, please visit:

http://olympiccoast.noaa.gov/involved/sac/sac_welcome.html.

Office of National Marine Sanctuaries (ONMS)

Olympic Coast National Marine Sanctuary is one of fourteen marine protected areas in the National Marine Sanctuary System encompassing more than 170,000 square miles of marine and Great Lakes waters from Washington State to the Florida Keys and from Lake Huron to American Samoa. The system includes thirteen national marine sanctuaries and the Papahānaumokuākea Marine National Monument. Visit the ONMS website at:

<http://www.sanctuaries.nos.noaa.gov/>.

Get Involved!

To learn how to get involved in the sanctuary visit:

<http://olympiccoast.noaa.gov/involved/welcome.html>.

OCNMS Staff

Carol Bernthal – Superintendent

George Galasso – Deputy Superintendent for Policy & Programs

Kevin Grant – Deputy Superintendent for Operations & Administration

Liam Antrim – Acting Research Coordinator

Jennifer Bright – Research Technician

Justin Ellis – NOAA Corps Officer, Marine Operations

Eric Evans – IT Consultant

Carey Floyd – Graphic and Web Designer

Nicole Harris – Education Specialist

Kathy Hough – Survey Technician

Norma Klein – Office Administrator

Karlyn Langjahr – AC Coordinator and Discovery Center Manager

Jacqueline Laverdure – Education and Outreach Coordinator

Danny Palmer – Education and Stewardship Specialist

Heidi Pedersen – Citizen Science Coordinator

Robert Rountree – Visitor Services Specialist

Nancy Wright – Geographer

Contact Information Olympic Coast National Marine Sanctuary

115 East Railroad Ave., Suite 301

Port Angeles, WA 98362

Phone (360) 457-6622

Fax (360) 457-8496

